



OSFCI : Open Firmware CI with real hardware execution.

Jean-Marie Verdun, Distinguished Technologist
Arun Darlie Koshy, Senior Engineer

HPE, Advanced Technology Team

#ossummit

<https://github.com/opencomputeproject/OSF-OSFCI>



FROM

...



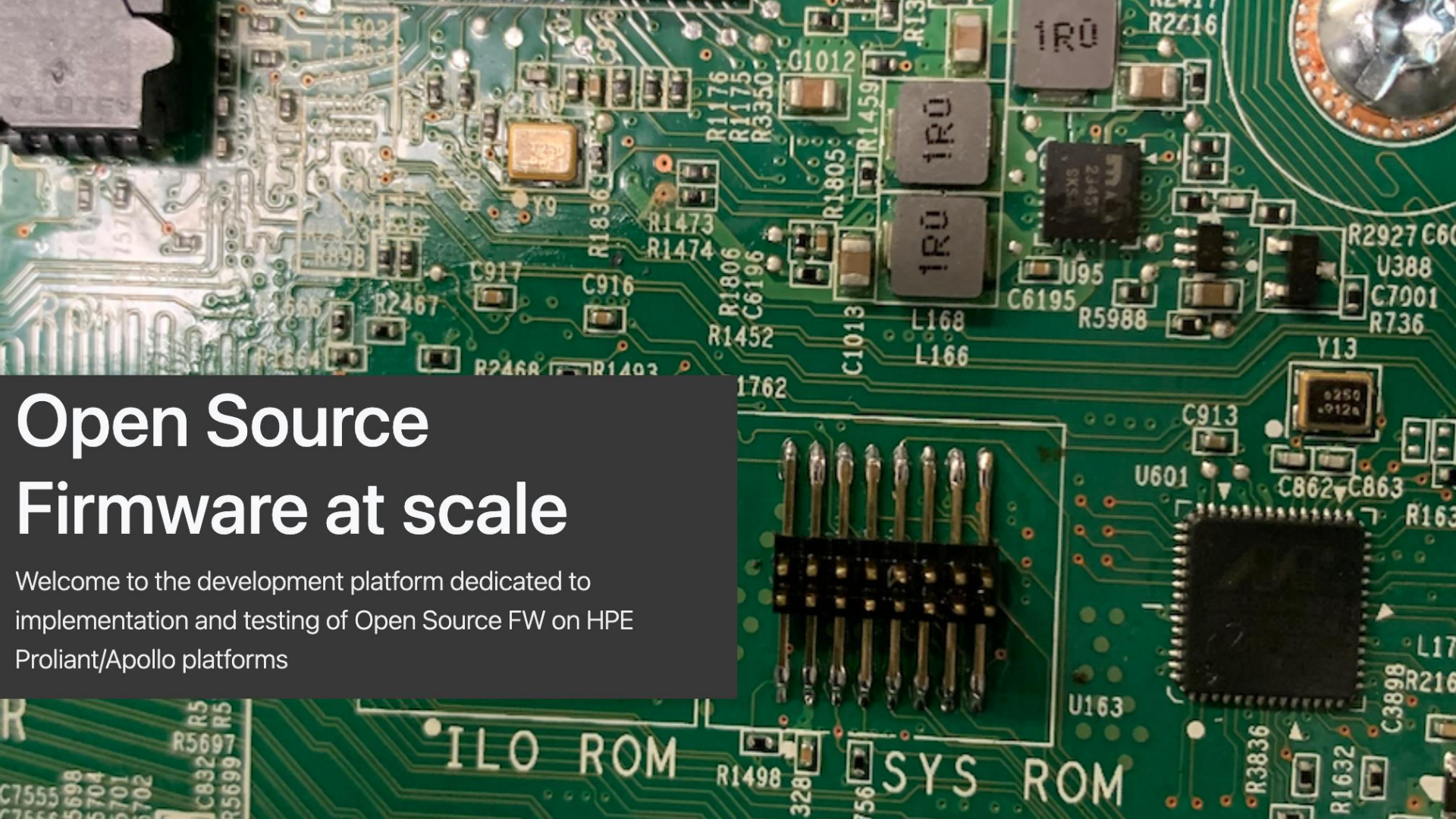


...TO

- The pandemic hit hard
 - Firmware development had to become fully remote
- Dual security model
 - Open-source with customer control
 - Proprietary with supplier liability
- Enable adoption at scale

GOALS

- Automate remote build, testing and release management of BMC and ROM firmware
- Validate on target that Open-Source Firmware works as expected (OpenBMC and LinuxBoot)
- Have specially provisioned instances for customers, public and OCP
- Make it fully open source and encourage community adoption



Open Source Firmware at scale

Welcome to the development platform dedicated to
implementation and testing of Open Source FW on HPE
Proliant/Apollo platforms

DEMO – BUILD OPENBMC

0d 0h 55m 18s

End Session

arunkoshy ▾

load standard OpenBMC

 Or

build

Load my Firmware

DL

Or

Just drag and drop your bmc firmware here

load standard bios

 Or

build

Load my Firmware

DL

Or

Just drag and drop your system bios here

NOTE: Tasks Summary: Attempted 4592 tasks of which 4147 didn't need to be rerun and all succeeded.
Summary: There were 6 WARNING messages shown.
0
Image successfully generated ...
DONE !
[]

Read 27262976 bytes of 67108864
Read 29360128 bytes of 67108864
Read 31457280 bytes of 67108864
Read 33554432 bytes of 67108864
Read 35651584 bytes of 67108864
Read 37748736 bytes of 67108864
Read 39845888 bytes of 67108864
Read 41943040 bytes of 67108864
Read 44040192 bytes of 67108864
Read 46137344 bytes of 67108864
Read 48234496 bytes of 67108864
Read 50331648 bytes of 67108864
Read 52428800 bytes of 67108864

DEMO – BUILD LINUXBOOT

0d 0h 58m 34s End Session arunkoshy ▾

load standard bios Or build Load my Firmware DL

Or

Just drag and drop your system bios here

Operating System Installer ▾

```
10600K ..... 99% 4.35M 0s
10605K ..... 99% 152M 0s
10610K ..... 99% 98.2M 0s
10615K ..... 99% 108M 0s
10620K ..... 99% 105M 0s
10625K ..... 99% 57.4M 0s
10630K ..... 99% 7.19M 0s
10635K ..... 99% 19.7M 0s
10640K ..... 99% 22.2M 0s
10645K ..... 99% 26.9M 0s
10650K ..... 99% 12.4M 0s
10655K ..... 99% 7.63M 0s
10660K ..... 99% 37.6M 0s
10665K ..... 99% 6.02M 0s
10670K ..... 99% 4.22M 0s
10675K ..... 99% 99.2M 0s
10680K ..... 99% 109M 0s
10685K ..... 100% 108M=13s

2021-11-10 14:57:17 (7.81 MB/s) - 'kernel.xz' saved [109441440/109441440]

xzcat kernel.xz | tar x
mv linux-5.4 linux
go get -u github.com/u-root/u-root
```

DEMO – LOAD

0d 0h 51m 23s

End Session

arunkoshy ▾

load standard OpenBMC

Or

build

Load my Firmware

DL

Or

Just drag and drop your bmc firmware here

load standard bios

Or

build

Load my Firmware

DL

Or

```
Sent: 29360128 bytes of 33554432
Sent: 31457280 bytes of 33554432
Sent: 33554432 bytes of 33554432
Transfer: Succeeded
Read: 2097152 bytes of 33554432
Read: 4194304 bytes of 33554432
Read: 6291456 bytes of 33554432
Read: 8388608 bytes of 33554432
Read: 10485760 bytes of 33554432
Read: 12582912 bytes of 33554432
Read: 14680064 bytes of 33554432
Read: 16777216 bytes of 33554432
Read: 18874368 bytes of 33554432
Read: 20971520 bytes of 33554432
Read: 23068672 bytes of 33554432
Read: 25165824 bytes of 33554432
Read: 27262976 bytes of 33554432
Read: 29360128 bytes of 33554432
Read: 31457280 bytes of 33554432
Read: 33554432 bytes of 33554432
Verify: PASS
Started EM100Pro
Starting terminal. Press CTL-C to exit.
```

```
Read: 27262976 bytes of 67108864
Read: 29360128 bytes of 67108864
Read: 31457280 bytes of 67108864
Read: 33554432 bytes of 67108864
Read: 35651584 bytes of 67108864
Read: 37748736 bytes of 67108864
Read: 39845888 bytes of 67108864
Read: 41943040 bytes of 67108864
Read: 44040192 bytes of 67108864
Read: 46137344 bytes of 67108864
Read: 48234496 bytes of 67108864
Read: 50331648 bytes of 67108864
Read: 52428800 bytes of 67108864
```


DEMO – POWER ON

0d 0h 55m 32s End Session arunkoshy ▾

Just drag and drop your system bios here

Operating System Installer ▾

BMC Web

Contest Web

connect power

disconnect power

```
Read 50331648 bytes of 67108864
Read 52428800 bytes of 67108864
Read 54525952 bytes of 67108864
Read 56623104 bytes of 67108864
Read 58720256 bytes of 67108864
Read 60817408 bytes of 67108864
Read 62914560 bytes of 67108864
Read 65011712 bytes of 67108864
Read 67108864 bytes of 67108864
Verify: PASS
Started EM100Pro
Starting terminal. Press CTL-C to exit.

[]
```

```
root@d1360poc-9440c941b11a:~# []
```

CONTEST INTEGRATION

Load standard tests

Or

Specify a github repo and

Load custom tests

Please select testcases:



Hostname validation



SSH connection validation

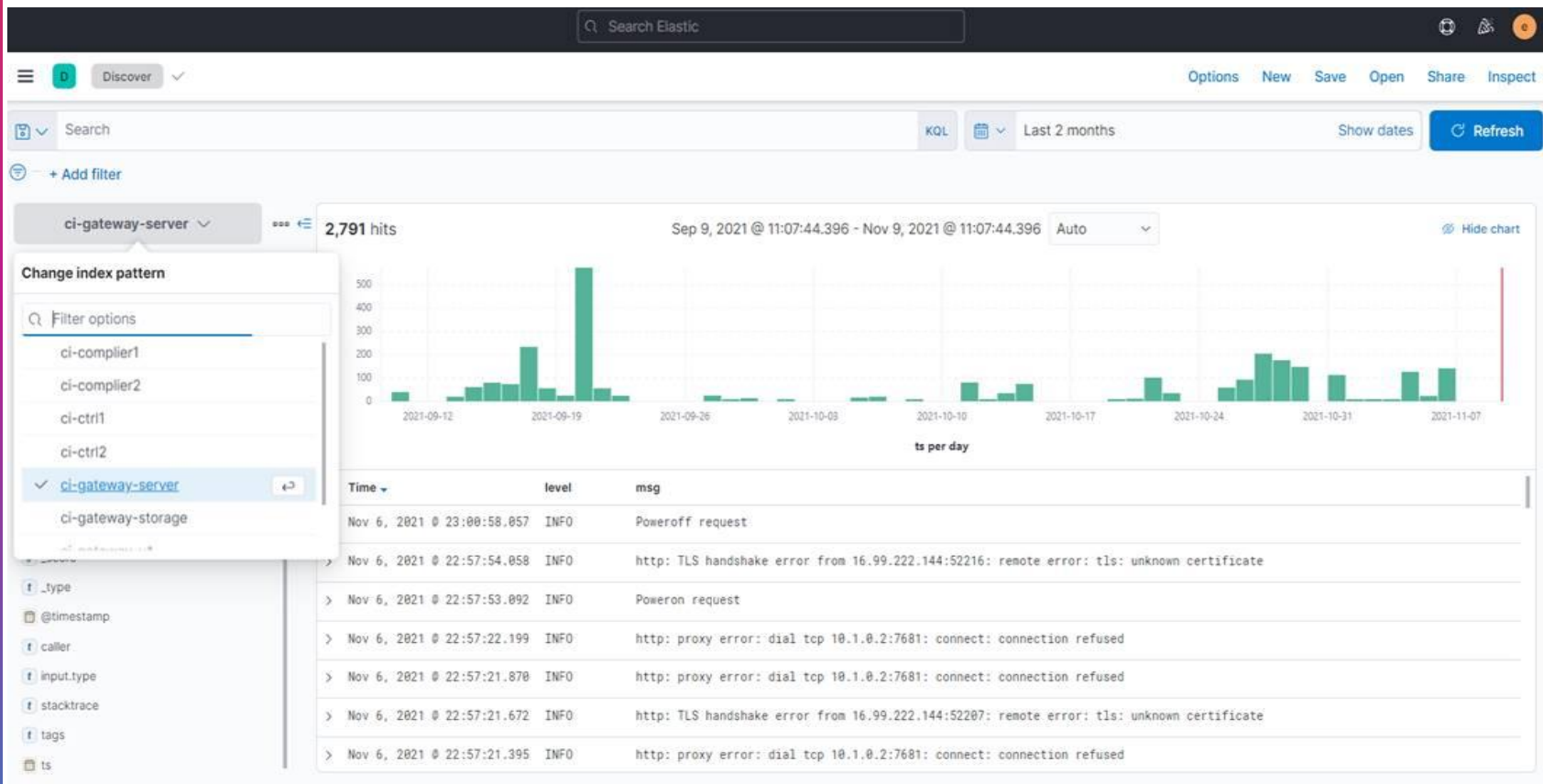
Run

Download results

```
        "{ { .FQDN } }"
      ],
      "password": [
        "0penBmc"
      ],
      "user": [
        "root"
      ]
    }
  },
  "TestName": "Literal test"
},
"TestFetcherName": "literal"
}
]
}]
requestor: [contestcli-http]

2022/04/13 21:10:40 HTTP POST failed: Post "http://10.3.0.148:8080/start": dial tcp 10.3.0.148:8080: connect: c
onnection refused
2022/04/13 21:10:40
2022/04/13 21:10:40 Error: Unable to execute the testcase
2022/04/13 21:10:40 Done
```

ANALYTICS



WHY IS THIS CRITICAL ?

- Easier developer workflow around build, debug and observability on real hardware
- Manual firmware development and validation has been disrupted by hybrid / remote-work model
- Enhanced hardware safety

ARCHITECTURE

- Modular architecture and configurable
- Written in Go
- API endpoints supporting:
 - Automation including external frameworks like Contest
 - Non-interactive mode
 - Build and load firmware, log retrieval, power operations
 - Example(s):
 - <https://github.com/opencomputeproject/OSF-OSFCI/tree/master/api>
- Enhanced analytics and logging
- Fully open-source under MIT license

OUTCOMES

- In use externally and internally
 - For both proprietary and open-source development
- Seed community efforts around a common set of tests
- Combine innovations from community members
- Used by OCP (Open Compute Project)

THE LINUX FOUNDATION

S OPEN SOURCE SUMMIT

NORTH AMERICA